



October 13, 1995

Mr. Michael DeRosa
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

**Subject: Data Validation of Waste Oil Sample Collected at the
Dow Chemical Company Facility, Hanging Rock, Ohio on July 25, 1995
EPA Contract No. 68-W4-0007, Work Assignment No. R05013**

Dear Mr. DeRosa:

PRC Environmental Management, Inc. (PRC), has reviewed the full analytical chemistry report on the waste oil sample collected at the Dow Chemical Company facility in Hanging Rock, Ohio, on July 25, 1995. As requested, PRC evaluated the results of the analysis. PRC has enclosed both a paper copy and a disk copy of the validation report (Enclosure 1); as well as the full analytical report including chain-of-custody forms (Enclosure 2).

The analytical results and evaluation are summarized in the enclosed laboratory report and data validation report. The sample contains much acrylonitrile, but no measurable benzene or toluene and no measurable metals. The identity of the acrylonitrile is confirmed. However, all normal procedures to check recovery of the compound from the sample and thereby confirm the concentration failed because of the extremely high concentration of acrylonitrile. Therefore, the organic compound concentrations are considered estimates. All other analytical results are unqualified.

If you have any questions, please call Dr. Kumar Topudurti at (312) 856-8742 or Dr. Harry Ellis at (312) 856-8756.

Sincerely,

A handwritten signature in purple ink that reads "Stanley Labunski".

Stanley Labunski
Environmental Engineer

SL/jmk

Enclosures (2)

cc: Bernie Orenstein, EPA PO (letter only)
Art Glazer, PRC Program Manager (letter only)
Ed Schuessler, PRC Regional Manager (letter only)
Kumar Topudurti, PRC Project Manager
Harry Ellis, PRC Environmental Scientist

ENCLOSURE 1

DATA VALIDATION OF SAMPLE COLLECTED ON JULY 25, 1995

(Seven Pages)

DATA VALIDATION OF SAMPLE COLLECTED ON JULY 25, 1995

This enclosure gives the results of a data validation of the analysis of an oil sample collected at the Dow Chemical Company facility in Hanging Rock, Ohio, on July 25, 1995. The Quanterra, Inc., facility in Arvada, Colorado, received the sample on August 1, 1995, for analysis as a high concentration sample for selected volatile organic compounds (VOC) and metals by SW-846 methods and for total chlorine, heat of combustion, and specific gravity by other approved methods from the American Society for Testing and Materials (ASTM). The results were validated by applying the following relevant U.S. Environmental Protection Agency (EPA) guidelines:

- "EPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review." Publication 9240.1-05, dated February 1994.
- "EPA CLP National Functional Guidelines for Inorganic Data Review." Publication 9240.1-05a, dated February 1994.

The procedures in these CLP documents were modified as necessary to conform to the procedures actually used by the laboratory and the quality control limits in the generic Quality Assurance Project Plan.

The following sections give the data validation results for the VOC analysis, metals analysis, and other analyses, plus a summary evaluating data quality. Validated analytical results are summarized in Table 1.

1.0 VOLATILE ORGANIC COMPOUND ANALYSIS

The sample was analyzed for benzene, toluene, and acrylonitrile by Method 8260. The high concentrations of acrylonitrile required a 12,500-fold dilution of the sample.

1.1 HOLDING TIME

The sample was analyzed within the holding time.

TABLE 1
VALIDATED ANALYTICAL RESULTS FOR TARGET COMPOUNDS

Analyte	Concentration	Qualifier	Units
Benzene	6,200	UJ ^a	mg/kg ^b
Toluene	6,200	UJ	mg/kg
Acrylonitrile	66,000	J	mg/kg
Antimony	6.0	U	mg/kg
Arsenic	0.50	U	mg/kg
Barium	1.0	U	mg/kg
Beryllium	0.20	U	mg/kg
Cadmium	0.50	U	mg/kg
Chromium	1.0	U	mg/kg
Lead	5.0	U	mg/kg
Mercury	0.10	U	mg/kg
Silver	1.0	U	mg/kg
Thallium	2.0	U	mg/kg
Chlorine	0.25	—	percent
Heat of combustion	22,000	—	Btu/lb ^c
Specific gravity	0.85	—	—

Notes:

- a U = Chemical was analyzed for but not detected; the number is the sample detection limit
J = Concentration is estimated for quality control reasons
- b mg/kg = Milligrams per kilogram
- c Btu/lb = British thermal units per pound

1.2 INSTRUMENT PERFORMANCE CHECK

The instrument performance check with bromofluorobenzene was run as required. All results were within QC limits.

1.3 INITIAL AND CONTINUING CALIBRATIONS

Initial and continuing calibrations were performed for the gas chromatograph as required. All results for target chemicals were within QC limits.

1.4 BLANK

A laboratory (method) blank was analyzed for target chemicals, but contained none.

1.5 SURROGATE SPIKES

Surrogate spikes (system monitoring compounds) were added to the samples. However, the necessary dilution reduced all three spike (toluene-d8; bromofluorobenzene; and 1,2-dichloroethane-d4) responses to below detection limits.

1.6 MATRIX SPIKE/MATRIX SPIKE DUPLICATE

The laboratory analyzed matrix spike/matrix spike duplicate (MS/MSD) samples, but did not report the results. The spikes were diluted far below their detection limits, so the results are considered to be unusable for determining matrix effects.

1.7 LABORATORY CONTROL SAMPLES

The laboratory ran duplicate laboratory control samples. Because this was a high-concentration waste sample, a soil matrix was used. All results were within QC limits.

1.8 INTERNAL STANDARDS

The analysis was performed by the external standard method; therefore, no internal standard results are available. If internal standards were used, the standards would probably have been diluted below detection levels.

1.9 TARGET COMPOUND IDENTIFICATION AND QUANTIFICATION

Neither benzene nor toluene was found in the sample. Very high concentrations (66,000 milligrams per kilogram [mg/kg] or 6.6 percent) of acrylonitrile were detected. Because the mass spectrum was a very good match, identification of the compound is certain. Quantification of the result is discussed below.

1.10 NONTARGET COMPOUNDS

The analysis found several nontarget aromatic hydrocarbons, specifically ethylbenzene (21,000 mg/kg); xylene (33,000 mg/kg); styrene (45,000 mg/kg); and isopropylbenzene (9,800 mg/kg). These results have the same degree of accuracy as the acrylonitrile results because the laboratory calibration mixture included all of these chemicals.

1.11 SYSTEM PERFORMANCE

The matrix, waste oil, can readily cause interference with the recoveries of VOCs. The method includes surrogate spikes in every sample and an MS/MSD in at least one sample for every 20 samples to check for such matrix interference. However, the extremely high levels of VOCs required high dilution of the sample, which reduced responses to all of the spiked compounds below detection limits. To produce such usable results would require using spike concentrations in the percent range and an additional dilution factor to account for the added volume of the spike.

Because no means exists to determine if matrix spike interference occurred in the sample, all VOC results are considered to be estimates and are qualified as such with a "J" flag.

2.0 METALS ANALYSIS

The sample was analyzed for antimony, barium, beryllium, cadmium, chromium, lead, and silver by inductively coupled plasma (ICP) using Method 6010. The sample was also analyzed for arsenic and thallium by furnace atomic absorption (FAA) using Methods 7060 and 7841 and for mercury by cold vapor atomic absorption (CVAA) using Method 7471.

2.1 HOLDING TIMES

All holding times were met.

2.2 CALIBRATION

All calibrations were performed as required with the results falling within QC limits.

2.3 BLANKS

Some laboratory blanks included low concentrations of a few target metals. Because no target metals were found in the sample, this typical result did not affect the analyses.

2.4 INTERFERENCE CHECK SAMPLE

The interference check sample results were within QC limits.

2.5 LABORATORY CONTROL SAMPLES

Duplicate laboratory control samples (blank spikes) were analyzed. As with the VOC analysis, a soil matrix was used. All results were within QC limits.

2.6 DUPLICATE ANALYSES

Laboratory duplicate analyses were performed. For the ICP metals, a sample from another site that was run simultaneously with this sample was used for the matrix spike and laboratory duplicate analyses so those results are considered to be unusable. Because no target metals were detected in this sample, no usable results were generated from the FAA and CVAA duplicate analyses, and no usable results would have been generated from an ICP duplicate analysis of this sample.

2.7 MATRIX SPIKE ANALYSES

Matrix spike analyses were run as required in the various methods. Most results were within QC limits. The exception was the postdigestion spike recovery for thallium, which was only 20 percent. The sample was diluted and rerun; this provided 65 percent recovery and is still below the QC limits of 85 to 115 percent. Because recoveries of the predigestion FAA matrix spike on the sample were acceptable, no qualification of results is required. Based on the data validator's experience, poor recoveries for post digestion spike samples are common with thallium analysis.

2.8 ICP QUALITY CONTROL

No ICP serial dilution was analyzed with this sample. This control provides information relevant only to high-concentration samples, so the omission does not affect the quality of the results.

2.9 SAMPLE RESULT VERIFICATION

None of the target metals was found in the sample. Detection limits were reported correctly.

2.10 SYSTEM PERFORMANCE

The analyses were properly performed. Results were within the usual range, with a typical assortment of minor exceedances of QC limits, as detailed above.

3.0 OTHER ANALYSES

Total chlorine was determined by using the chlorine in coal method (ASTM Method D2361); this involves oxidation of the sample followed by titration of the residue with a mercury solution. The laboratory ran a blank and a laboratory control sample; all results were within QC limits.

Heat of combustion was determined by bomb calorimetry (ASTM Method D240). No control except calibration of the balance and thermometers is involved in this analysis.

Specific gravity was determined by pycnometry (ASTM Method D2710). No control other than balance calibration is required in this analysis.

4.0 OVERALL DATA QUALITY EVALUATION

The results presented in Table 1 are acceptable as qualified. The metals analyses fully merit data quality objective (DQO) Level IV status. The VOC analysis does not merit such status because no means exists to determine the presence or absence of matrix interferences in a sample that could readily produce such interference. It should be considered DQO Level III. The other analyses are inherently DQO Level III and met requirements for that status.

ENCLOSURE 2

QUANTERRA, INC., SUMMARY REPORT

(24 Pages)

ANALYTICAL RESULTS
FOR
PRC ENVIRONMENTAL MANAGEMENT, INC.
Denver no. 043755
August 27, 1995

Reviewed by:



Daniel Rebarchik



Kevin McHugh

I. OVERVIEW

On August 1, 1995, Quanterra Environmental Services, Denver laboratory received I waste sample from PRC Environmental management, Inc.

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- I. Overview
- II. Sample Description Information/Analytical Test Requests
- III. Analytical Results
- IV. Quality Control Report

All analyses at Quanterra's Denver laboratory are performed so that the maximum concentration of sample consistent with the method is analyzed. Dilutions are at times required to achieve linearity of the specific parameter or to reduce matrix interferences. In this event, reporting limits are adjusted proportionately. Surrogates may not be reportable in samples that have been diluted.

Sample Receipt

Per client instructions the sample was composited from the four sample jars received.

Volatile Organics

Sample 043755-0001 was analyzed for volatile organics by method 8260. The sample was diluted to bring the concentration of acrylonitrile within the calibration range of the method. The surrogates were diluted out and the reporting limits were raised accordingly.

Metals

Sample 043755-0001 was analyzed for thallium by method 7841. The sample was diluted due to matrix interferences. The reporting limit was raised accordingly.

With the exception of the above mentioned anomalies, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

II. SAMPLE DESCRIPTION INFORMATION/ANALYTICAL TEST REQUESTS

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Quanterra's Denver laboratory is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

SAMPLE DESCRIPTION INFORMATION
for
PRC Environmental Management, Inc

Lab ID	Client ID	Matrix	Sampled Date	Time	Received Date
043755-0001-SA	CHAIN OF CUSTODY #0201 (1-4)	WASTE	25 JUL 95	17:30	01 AUG 95

ANALYTICAL TEST REQUESTS
for
PRC Environmental Management, Inc

Lab ID: 043755	Group Code	Analysis Description	Custom Test?
0001	A	ICP Suite	Y
		Prep - Total Metals, ICP	N
		Arsenic, Furnace AA	N
		Prep - Total Metals, Furnace AA	N
		Thallium, Furnace AA	N
		Mercury, Cold Vapor AA	N
		Prep - Mercury, Cold Vapor AA	N
		TCL Volatile Organics	Y
		Prep - Prelim. GC Screen for Volatile Organics	N
		Chlorine in Coal	N
		Heat of Combustion	N
		Specific Gravity	N

III. ANALYTICAL RESULTS

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin. The date prepared is typically the date an extraction or digestion was initiated. For volatile organic compounds in water, the date prepared is the date the screening of the sample was performed.

Data sheets contain a listing of the parameters measured in each test, the analytical results and Quanterra's Denver laboratory reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the affect of the sample matrix on the performance of the method. The results from Quanterra's Denver laboratory standard QA/QC Program, which generates data which are independent of matrix effects, is given in Section IV.

The analytical data reported are subject to the following limitations of the analytical methodology:

Volatile Organics

- a) Due to the chemical nature of ethanol, this component cannot be consistently recovered using EPA Method 624 or 8240. This component is reported with a NR (Not Recoverable) in place of a reporting limit.
- b) Methylene chloride and acetone are common laboratory contaminants in GC/MS analysis. We have programs in place to minimize contamination, occasionally these compounds will be found at low levels in samples.

Metals

All nominal reporting limits for metals have been established from instrument detection limit (IDL) evaluations and represent the level above which reliable data can be routinely obtained. Low level standards are analyzed seven times on three non-consecutive days on each instrument. The standard deviations of the three runs are summed to yield the IDL. Nominal reporting limits are generally 2-5 times the IDL (consistent with the American Chemical Society definition for the Limit of Quantification). The ability to achieve these quoted reporting limits is verified each quarter. Reporting limits above the nominal levels are often submitted due to matrix interferences or elevated analyte levels.

Reporting limits for metals analyzed by Inductively Coupled Plasma (ICP) are typically raised only for dilution due to an analyte exceeding the instrument linear range. Background and interelement interferences are corrected automatically and do not require dilution.

Metals analyzed by Graphite Furnace Atomic Absorption (GFAA) are subject to matrix interferences. Consequently, Quanterra's Denver laboratory protocol is to analyze a spiked aliquot with every sample. The severity of the interference, based upon analyte level and spike recovery, is assessed against specific criteria and the need for an elevated reporting limit or dilution is determined.

The analysis of mercury by Cold Vapor Atomic Absorption (CVAA) is generally free from matrix interferences. As with ICP, reporting limits are raised only for dilution due to a sample concentration exceeding the linear range of the instrument.

TCL Volatile Organics

Method 8240

Client Name: PRC Environmental Management, Inc

Client ID: CHAIN OF CUSTODY #0201 (1-4)

Lab ID: 043755-0001-SA

Matrix: WASTE

Authorized: 01 AUG 95

Sampled: 25 JUL 95

Prepared: 02 AUG 95

Received: 01 AUG 95

Analyzed: 03 AUG 95

Parameter	Result	Units	Reporting Limit
Benzene	ND	mg/kg	6200
Toluene	ND	mg/kg	6200
Acrylonitrile	66000	mg/kg	--
Surrogate	Recovery		
Toluene-d8	ND	%	
4-Bromofluorobenzene	ND	%	
1,2-Dichloroethane-d4	ND	%	

ND = Not detected

NA = Not applicable

Reported By: Sandra Jones

Approved By: Audrey Cornell

Metals

Total Metals

Client Name: PRC Environmental Management, Inc

Client ID: CHAIN OF CUSTODY #0201 (1-4)

Lab ID: 043755-0001-SA

Matrix: WASTE

Authorized: 01 AUG 95

Sampled: 25 JUL 95

Prepared: See Below

Received: 01 AUG 95

Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Antimony	ND	mg/kg	6.0	6010	08 AUG 95	09 AUG 95
Arsenic	ND	mg/kg	0.50	7060	14 AUG 95	15 AUG 95
Barium	ND	mg/kg	1.0	6010	08 AUG 95	09 AUG 95
Beryllium	ND	mg/kg	0.20	6010	08 AUG 95	09 AUG 95
Cadmium	ND	mg/kg	0.50	6010	08 AUG 95	09 AUG 95
Chromium	ND	mg/kg	1.0	6010	08 AUG 95	09 AUG 95
Lead	ND	mg/kg	5.0	6010	08 AUG 95	09 AUG 95
Mercury	ND	mg/kg	0.10	7471	07 AUG 95	08 AUG 95
Silver	ND	mg/kg	1.0	6010	08 AUG 95	09 AUG 95
Thallium	ND	mg/kg	2.0	7841	14 AUG 95	16 AUG 95

ND = Not detected

NA = Not applicable

Reported By: Patrick Carroll

Approved By: Richard Persichitte

General Chemistry

Client Name: PRC Environmental Management, Inc

Client ID: CHAIN OF CUSTODY #0201 (1-4)

Lab ID: 043755-0001-SA

Matrix: WASTE

Authorized: 01 AUG 95

Sampled: 25 JUL 95

Prepared: See Below

Received: 01 AUG 95

Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chlorine	0.25	%	0.10	D 2361-91	17 AUG 95	17 AUG 95
Specific Gravity	0.85	--	NA	ASTM 2710 F	17 AUG 95	17 AUG 95
Heat of Combustion	22,000	Btu/lb	1,000	SM18 D 240/E	09 AUG 95	09 AUG 95

ND = Not detected
NA = Not applicable

Approved By: LMILLER

IV. QUALITY CONTROL REPORT

Quanterra laboratories operate under a rigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

The standard laboratory QC package is designed to:

- 1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data
- 2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix
- 3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and
- 4) provide a standard set of reportables which assures the client of the quality of his data.

Quanterra's Denver laboratory QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or conventional analyses) a single DCS serves as the control sample. An SCS is prepared for each sample lot for which the DCS pair are not analyzed. The recovery of the SCS is charted in exactly the same manner as described for the DCS, and provides a daily check on the performance of the method.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
043755-0001-SA	WASTE	B240-W	02 AUG 95-A	02 AUG 95-A2

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Spiked	Concentration		Measured DCS2	AVG	Accuracy Average(%)		Precision (RPD)	
		DCS1				DCS	Limits	DCS	Limit
Category: 8240-W									
Matrix: WASTE									
QC Lot: 02 AUG 95-A									
Concentration Units: mg/kg									
1,1-Dichloroethene	5.00	4.75	4.63	4.69	94	44-148	2.6	17	
Trichloroethene	5.00	4.69	4.73	4.71	94	71-134	0.9	13	
Benzene	5.00	5.13	5.24	5.18	104	64-128	2.1	12	
Toluene	5.00	5.59	5.53	5.56	111	66-123	1.1	13	
Chlorobenzene	5.00	6.21	5.96	6.08	122	74-131	4.1	12	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits

Category: 8240-W

Matrix: WASTE

QC Lot: 02 AUG 95-A QC Run: 02 AUG 95-A2

Concentration Units: mg/kg

1,2-Dichloroethane-d4	5.00	5.30	106	70-121
4-Bromofluorobenzene	5.00	5.67	113	77-121
Toluene-d8	5.00	5.37	107	81-117

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Volatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 8240-TCL-W			
Matrix: WASTE			
QC Lot: 02 AUG 95-A QC Run: 02 AUG 95-A2			
Benzene	ND	mg/kg	0.50
Toluene	ND	mg/kg	0.50
Acrylonitrile	ND	mg/kg	-.00

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
043755-0001-SA	SOIL	ICP-S	08 AUG 95-N2	08 AUG 95-N2
043755-0001-SA	SOIL	AS-FAA-S	14 AUG 95-N5	14 AUG 95-N5
043755-0001-SA	SOIL	TL-FAA-S	14 AUG 95-N5	14 AUG 95-N5
043755-0001-SA	SOIL	HG-CVAA-S	07 AUG 95-N3	07 AUG 95-N3

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration		Measured DCS2	AVG	Accuracy Average(%)		Precision (RPD)	
	Spiked	DCS1			DCS	Limits	DCS	Limit
Category: ICP-S								
Matrix: SOIL								
QC Lot: 08 AUG 95-N2								
Concentration Units: mg/kg								
Aluminum	200	201	207	204	102	80-120	3.0	20
Antimony	50	47.1	48.8	48.0	96	80-120	3.6	20
Arsenic	50	47.9	50.0	49.0	98	80-120	4.2	20
Barium	200	197	201	199	100	80-120	2.4	20
Beryllium	5.0	4.96	5.12	5.04	101	80-120	3.3	20
Boron	1000	936	960	948	95	80-120	2.5	20
Cadmium	5.0	4.21	4.65	4.43	89	80-120	10	20
Calcium	10000	9990	10400	10200	102	80-120	3.8	20
Chromium	20	18.7	19.1	18.9	94	80-120	2.4	20
Cobalt	50	50.0	52.7	51.4	103	80-120	5.2	20
Copper	25	24.7	25.5	25.1	100	80-120	3.1	20
Iron	100	106	103	104	104	80-120	2.9	20
Lead	50	50.4	51.7	51.1	102	80-120	2.7	20
Magnesium	5000	5010	5220	5110	102	80-120	4.1	20
Manganese	50	50.1	52.2	51.1	102	80-120	4.0	20
Nickel	50	48.9	51.1	50.0	100	80-120	4.3	20
Potassium	5000	4990	5150	5070	101	80-120	3.1	20
Silver	5	5.08	5.15	5.11	102	80-120	1.3	20
Sodium	10000	10100	10400	10200	102	80-120	2.7	20
Thallium	500	494	505	500	100	80-120	2.2	20
Tin	50	51.2	52.4	51.8	104	80-120	2.3	20
Vanadium	50	50.2	51.2	50.7	101	80-120	2.0	20
Zinc	50	48.2	50.1	49.1	98	80-120	3.8	20

Category: AS-FAA-S
Matrix: SOIL
QC Lot: 14 AUG 95-N5
Concentration Units: mg/kg

Arsenic	3.00	2.66	2.33	2.50	83	75-128	13	13
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Category: TL-FAA-S
Matrix: SOIL
QC Lot: 14 AUG 95-N5
Concentration Units: mg/kg

Thallium	3.0	2.91	2.57	2.74	91	75-125	12	20
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Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Spiked	Concentration		Measured DCS2	AVG	Accuracy Average(%)		Precision (RPD)			
		DCS1				DCS	Limits	DCS Limit			
Category: HG-CVAA-S											
Matrix: SOIL											
QC Lot: 07 AUG 95-N3											
Concentration Units: mg/kg											
Mercury	0.500	0.501		0.518	0.510	102	88-113	3.2 1			

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-W			
Matrix: WASTE			
QC Lot: 08 AUG 95-N2 QC Run: 08 AUG 95-N2			
Antimony	ND	mg/kg	6.0
Barium	ND	mg/kg	1.0
Beryllium	ND	mg/kg	0.20
Cadmium	ND	mg/kg	0.50
Chromium	ND	mg/kg	1.0
Lead	ND	mg/kg	5.0
Silver	ND	mg/kg	1.0

Test: AS-FAA-W
Matrix: WASTE
QC Lot: 14 AUG 95-N5 QC Run: 14 AUG 95-N5

Arsenic	ND	mg/kg	0.50
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Test: TL-FAA-W
Matrix: WASTE
QC Lot: 14 AUG 95-N5 QC Run: 14 AUG 95-N5

Thallium	ND	mg/kg	0.50
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Test: HG-CVAA-W
Matrix: WASTE
QC Lot: 07 AUG 95-N3 QC Run: 07 AUG 95-N3

Mercury	ND	mg/kg	0.10
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CHAIN EPA

CLIENT/PROJECT NAME DOW CHEMICAL		PROJECT LOCATION HANGING ROCK, OHIO		ANALYSIS		REMARKS	
PROJECT #		FIELD LOGBOOK #				ALL FOUR SAMPLES TO BE COMBINED FOR A COMPOSITE SAMPLE OF 1602.	
SAMPLER(SIGNATURE) <i>David R. Stamps</i>		CHAIN OF CUSTODY # 0201					
SAMPLE#	DATE	TIME	LAB SAMPLE NUMBER	TYPE OF SAMPLE			
1	7/25/95	17:30		LIQUID 402			
2	7/25/95	17:30		LIQUID 402			
3	7/25/95	17:30		LIQUID 402			
4	7/25/95	17:30		LIQUID 402			
RELINQUISHED BY: (SIGNATURE) <i>David R. Stamps</i>		DATE/TIME: 7/25/95		RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE/TIME: 7/25/95 1030	
RELINQUISHED BY: (SIGNATURE)		DATE/TIME:		RECEIVED BY: (SIGNATURE)		DATE/TIME:	
RELINQUISHED BY: (SIGNATURE)		DATE/TIME:		RECEIVED BY: (SIGNATURE)		DATE/TIME:	
SAMPLE DISPOSAL METHOD:		REFERENCE M.S.D.S. SHEETS		DISPOSED OF BY: (SIGNATURE)		DATE/TIME:	
SAMPLE COLLECTOR: DAVE STAMPER				ANALYTICAL LABORATORY			
WITNESSED BY: CONNIE L BOGARD U.S. EPA REGION 5				QUANTERRA LABORATORIES 4955 YARROW STREET ARVADA, CO. 80002 ATTN: KEVIN McHUGH 303-421-6611			

43755
-01

Project #: 4-100 Date: 11/17/94 Services: _____
Company Name & Sampling Site: PRC
Cooler #(s): _____
Temperature: 9.8
*Place copy of serial inside all non-QUANTURA containers. Describe here.

Unpacking & Labeling Check Points:

Yes	No		Initials	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Radiation checked, record if reading > 0.5 mR/hr. (_____ mR/hr)	<u>JD</u>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Cooler seals intact.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Chain of custody present.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Bottles broken are leaking, comment if yes.		
<div style="border: 1px solid black; padding: 2px; display: inline-block;">PHOTOGRAPH BROKEN BOTTLES</div>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Containers labeled, comment if no.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. pH of all samples checked and meet requirements, note exceptions.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Chain of custody includes "received by" and "relinquished" by signatures, dates, and times		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. Chain of custody agrees with bottle count, comment if no.		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. Chain of custody agrees with labels, comment if no.		
<input type="checkbox"/>	<input type="checkbox"/>	10. VOA samples filled completely, comment if no.		
<input type="checkbox"/>	<input type="checkbox"/>	11. Are VOA bottles preserved, check for labels. <u>(N/A)</u>		
<input type="checkbox"/>	<input type="checkbox"/>	12. Sediment present in "D," dissolved, bottles.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	13. Are analyses with short holding times requested.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	14. Is extra sample volume provided for MS, MSD or matrix duplicates.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	15. Multiphase samples present, comment is yes.		
<div style="border: 1px solid black; padding: 2px; display: inline-block;">PHOTOGRAPH MULTIPHASE SAMPLES</div>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. Clear picture taken, labeled, and stapled to project folder.		

Comments: Include action taken to resolve discrepancies/problems. Include a hard copy of e-mail or use extra paper if more space is needed. _____

